

### **REMARKS/ARGUMENTS**

Applicants appreciate the thorough examination of the present application, as evidenced by the first Official Action. The first Official Action provisionally rejects Claim 6 under 35 U.S.C. § 112 as indefinite; rejects Claims 1, 3, 6-9, 11, 14, 15 and 17 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,154,581 to Borufka et al.; and rejects Claims 2, 4, 10, 12 and 16 under 35 U.S.C. § 103(a) as being unpatentable over the Borfuka patent in view of U.S. Patent No. 6,371,727 to Stangeland. Finally, the first Official Action also found Claims 19-23 allowable as submitted and Claims 5, 13 and 18 allowable if rewritten in independent form. Applicants appreciate the Examiner's allowance of these claims.

In response to the first Official Action, Applicants have rewritten Claims 5, 13 and 18 in independent form and amended independent Claim 8 to further clarify the claimed invention. In view of the Official Action and the amendments to the aforementioned claims, Applicants have also cancelled Claim 14, and amended the dependencies of Claim 6, 15 and 17. As explained below, Applicants respectfully submit that the claimed invention of original independent Claim 1 and by dependency Claims 2-4 and 6-7, is patentably distinct from the Borufka patent and the Strangeland patent, alone or in combination.

#### **I. Allowable Material**

In response to the first Official Action, Applicants have rewritten Claims 5, 13 and 18 in independent form, including all the recitations of any intervening claims. Applicants therefore respectfully submit that allowable Claims 5, 13 and 18 are in condition for immediate allowance.

#### **II. Amended Claim 6 is Allowable**

Claim 6 stands rejected under 35 U.S.C. § 112 of insufficient antecedent basis for the limitation "said opposed leading and trailing edges and said opposed first and second circumferential sides." The dependency of Claim 6 has been amended to provide sufficient antecedent basis for this limitation. Applicants therefore respectfully submit that Claim 6 is in condition for immediate allowance.

**III. Claims 1, 3, 6-9, 11, 14, 15 and 17 are Patentable over Borufka**

Applicants respectfully traverse the rejection of Claims 1, 3, 6-9, 11, 14, 15 and 17 as anticipated by the Borufka patent. The rejection, in its entirety, states:

Borufka et al. discloses a blade of a rotor assembly comprising a root portion 2; an airfoil portion 3; and a shroud 4 extending radially from the airfoil portion. The shroud has a lower portion with a thickness in the radial direction and a *reinforcing flange and sealing rail 5* extending radially from the lower portion wherein the flange has a height that is at least three times greater than the minimum thickness of the lower portion of the shroud (See figure 2). The shroud lower portion extends axially between opposed leading and trailing edges that are tapered [sic, tapered] (See figures 3a and 3b) and extends circumferentially between opposed first and second circumferential sides. The lower portion of the shroud further defines a constant thickness between the opposing leading and trailing edges. (emphasis added).

The Borufka patent discloses a rotor shroud in which the surfaces of adjacent shroud portions are formed with at least one “Z-shaped separation gap.” Borufka Col. 1, lines 7-12. The Z-shaped separation gap includes “one part of relatively small gap width for damping purposes (damping gap) and another of relative large gap width which remains open (free gap).” *Id.* In the preferred embodiment of Borufka, two damping gaps are provided which are axially spaced apart and which are oriented at an angle of from 70° to 90° relative to the axis of rotation of the rotor.” *Id.* at Col. 2, lines 9-11. “During operation, the damping gaps and are normally completely closed, i.e. the shroud band portions and are frictionally engaged at these gaps[,] whereas the free gaps remain open.” *Id.* at Col. 3, lines 56-58. The damping gap angle of orientation reduces the effect on damping of peripheral or circumferential expansion of the shroud (due to, for example, acceleration of the rotor). *Id.* at Col. 2, lines 26-36. In one embodiment of Borufka, “the damping gaps are arranged in the sealing lips” - continuous bands “extending circumferentially around the shroud band” that minimize fluid flow through the gap between the shroud band and the outer housing. *Id.* at Col. 2, lines 49-69. This arrangement of the damping gaps in the sealing lips “has the advantage that the gaps between adjacent portions of the sealing lips can be eliminated, during operation, by take-up of the gap width of the damping gaps.” *Id.* at Col. 4, lines 7-13.

Contrary to the Examiner’s assertion, the Borufka patent does not disclose reinforcing flange structures but only monolithic sealing rails. As can be seen in Figure 4, the sealing lips 5a

and 5b of Borufka extend directly from the shroud band 4 without any intervening reinforcing flange structure. This radial extension of the sealing lip is characterized by a smooth gradual slope from top to bottom. There is no discontinuity defining separate reinforcing flange and sealing lip structures. As shown in the embodiment of Figure 4, the width of the reinforcing flange relative to the width of the sealing rail defines two distinct structures via the sharp discontinuity in width. To the extent any discontinuity can be identified in Figure 2 of Borufka, the ostensible "reinforcing flange" height is not three times the shroud band thickness as required by Claim 1. Further, Borufka does not disclose, either expressly or implicitly, any reinforcing characteristic of the sealing rail. Therefore, Applicants respectfully submit that Claim 1 is patentable over the Borufka patent and respectfully request reconsideration and allowance of Claim 1.

Notwithstanding the above, Applicants have amended independent Claim 8 to further distinguish the Borufka patent, which does not disclose a reinforcing flange with a radially distal surface that is substantially parallel to the shroud with a sealing rail extending radially from the reinforcing flange, as recited in amended independent Claim 8. This amendment introduces no new matter; support for the amendment can be found in page two of the present application as well as Figures 4 and 7. Applicants respectfully submit that amended Claim 8 is also patentably distinct from the Borufka patent.

In light of the arguments and amendments above, Applicants respectfully submit that the rejection based upon Borufka is overcome and respectfully request allowance of Claims 1, 3, 6-9, 11, 14, 15 and 17.

#### **IV. Claims 2, 4, 10, 12 and 16**

In light of the amendments and arguments above, Applicants respectfully submit that the rejection of Claims 2, 4, 10, 12 and 16 under 35 U.S.C. § 103(a) as being unpatentable over the Borufka patent in view of the Stangeland patent has also been overcome. Each of dependent Claims 2, 4, 10, 12 and 16 now directly or indirectly depend from respective ones of allowable independent Claims 1, 8 and 18, Applicants respectfully submit that dependent Claims 2, 4, 10, 12 and 16 are allowable and request allowance of these claims.

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### **CONCLUSION**

In view of the remarks presented above, Applicants respectfully submit that the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is therefore respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicants' undersigned attorney in order to resolve any remaining issues.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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